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Science and Technology for Tomorrow's Aerospace Forces

Success Story

ADAPTIVE OPTICS EXPERIMENT COMPLETED

The Directed Energy Directorate recently completed an adaptive optics experiment at the directorate's North Oscura Peak site in the northern portion of the United States Army's White Sands Missile Range in New Mexico. The experiment demonstrated how a beam-control system could transmit a laser beam over a long, nearly horizontal path to a moving target. The system also corrected for the distorting effects of optical turbulence in the atmosphere. If unchecked, optical turbulence could limit the range and effectiveness of a laser.

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Accomplishment

Directorate engineers designed the Dynamic Compensation experiment to replicate the functionality of the beam control system on the Airborne Laser (ABL). The experiment will help keep the ABL program on track by validating its beam control design against non-cooperative targets. An improvement factor of 5 to 20 between the uncompensated and compensated laser spots on the target was noted. This unprecedented performance in strong turbulence will pave the way for many future directed energy applications.

Background

The directorate uses the North Oscura Peak site to conduct research for improving the Air Force's ability to track and apply laser energy to destroy missiles. This research benefits the ABL, which uses a laser aboard a jumbo jet to destroy theater ballistic missiles hundreds of miles away.

Facilities at North Oscura Peak house a 1-meter telescope and a beam director that projects a 10-watt scoring laser toward various targets. The experiment used targets located at a static site, such as Salinas Peak—approximately 35 miles south of North Oscura Peak, or moving targets on a Cessna Caravan aircraft with an instrumented target board. North Oscura Peak also has state-of-the-art tracking and adaptive optics systems that correct the outgoing laser beam for the effects of atmospheric optical turbulence.

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTT, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (01-DE-02)